CLAIMS

What is claimed is:

1. A microrelay comprising:

a micromachined deflectable actuator having first and second actuator surfaces and first and second conductive regions electrically isolated from each other;

a first cap having a first cap surface adjacent the first actuator surface, the first cap having third, fourth and fifth conductive regions electrically isolated from each other, the third conductive region being adjacent the first conductive region, the fourth and fifth conductive regions being adjacent the second conductive region;

a second cap having a second cap surface adjacent the second surface of the actuator, the second cap having a sixth conductive region adjacent the first conductive region;

the actuator being deflectable in a first direction to allow the second conductive region to contact the fourth and fifth conductive region, and the first and third conductive regions to not electrically contact each other;

the actuator being deflectable in a second direction opposite the first direction so that the first and sixth regions move closer without electrically contacting each other;

the actuator being hermetically sealed within the microrelay, the first, third, fourth, fifth and sixth conductive regions being electrically accessible externally to the microrelay.

2. The microrelay of claim 1 further comprised of at least one electrically insulative region between the first and third conductive regions.

3. The microrelay of claim 2 wherein the electrically insulative region between the first and third conductive regions is smaller in area than the first and third conductive regions.

4. The microrelay of claim 1 further comprised of at least one electrically insulative region between the first and sixth regions.

5. The microrelay of claim 4 wherein the electrically insulative region between the first and sixth conductive regions is smaller in area than the first and sixth conductive regions.

6. The microrelay of claim 1 wherein the actuator and second cap are fabricated as an integral micromachined part.

7. The microrelay of claim 6 wherein the actuator and second cap are fabricated starting with a silicon semiconductor substrate.

8. The microrelay of claim 7 wherein the first cap is a glass cap.

9. The microrelay of claim 8 wherein the first, third, fourth, fifth and sixth conductive regions are electrically accessible externally to the microrelay through contacts on a second cap surface of the first cap.

10. The microrelay of claim 1 wherein the actuator, the first cap and the second cap are fabricated as separate micromachined parts.

11. The microrelay of claim 10 wherein the actuator is fabricated starting with a silicon semiconductor substrate.

12. The microrelay of claim 11 wherein the first and second caps are glass caps.

13. The microrelay of claim 8 wherein the first, third, fourth, fifth and sixth conductive regions are electrically accessible externally to the microrelay through contacts on a second cap surface of the first cap.

14. A method of providing a microrelay switch function comprising:

providing a microrelay having:

an actuator having first and second actuator surfaces and first and second conductive regions electrically isolated from each other;

a first cap having a first cap surface adjacent the first actuator surface, the first cap having third, fourth and fifth conductive regions electrically isolated from each other, the third conductive region being adjacent the first conductive region, the fourth and fifth conductive regions being adjacent the second conductive region;

a second cap having a second cap surface adjacent the second surface of the actuator, the second cap having a sixth conductive region adjacent the first conductive region;

the actuator being deflectable in a first direction to allow the second conductive region to contact the fourth and fifth conductive region, and the first and third conductive regions to not electrically contact each other;

the actuator being deflectable in a second direction opposite the first direction so that the first

and sixth regions move closer without electrically contacting each other;

a) when a relay switch is to be closed, providing voltages on the first, third and sixth regions so that the actuator is attracted toward the first cap and not the second cap to put the second region in electrical contact with the fourth and fifth regions; and,

b) when the relay switch is to be opened, providing voltages on the first, third and sixth regions so that the actuator is attracted toward the second cap and not the first cap to prevent the second region from making electrical contact with the fourth and fifth regions.

15. The method of claim 14 wherein the voltages are square wave voltages of the same frequency, the voltages on the first and sixth regions in a) being of the same phase and the voltages on the first and third regions being of opposite phase, and in b), the voltages on the first and third regions in a) being of the same phase and the voltages on the first and sixth regions being of opposite phase.

16. The method of claim 14 wherein the square wave voltages are square wave voltages of zero average value.